

LESSON

4.6

Challenge Practice

For use with pages 275–282

In Exercises 1 and 2, write a quadratic equation that has the given solutions.

1. $\pm 5i$
2. $-3 \pm 2i\sqrt{2}$

In Exercises 3 and 4, evaluate the expression.

3. $i^{44} + i^{150} - i^{74} - i^{109} + i^{61}$
4. $i^{24} + i^{56} + i^{98} - i^{108} - i^{32}$

In Exercises 5–8, determine whether the statement is *true* or *false*. Justify your reasoning.

5. There is no complex number that is equal to its complex conjugate.
6. The sum of two imaginary numbers is always an imaginary number.
7. The product of a complex number $a + bi$ and its conjugate is always a real number.
8. The absolute values of a complex number and its complex conjugate are always equal.
9. Show that the complex conjugate of the sum of two complex numbers $a + bi$ and $c + di$ is the sum of their complex conjugates.
10. Show that the complex conjugate of the product of two complex numbers $a + bi$ and $c + di$ is the product of their complex conjugates.
11. Consider the function $h = -16t^2 + h_0$, which represents the height h of an object t seconds after it has been dropped from an initial height h_0 . Determine the condition in which the equation has only real number solutions.